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ABSTRACT

The role of inhibition as related to sex differences in aggression was investigated using 20 nursery school and 20 second grade children. A dart gun was employed, with choices of four targets--drawings of a boy, a girl, a zebra, and an object. There were three sessions and eight target choices per session. Choice of the human target was assumed to indicate low inhibition; choice of the object target, high inhibition. Age differences were as predicted; second graders were more inhibited than nursery school children. Sex differences were as predicted for the older children; in the younger group, girls were more aggressive than boys. Session effects interacted with age and sex to form different patterns of response for the four groups. Differences between nursery school and second grade girls were larger than differences between nursery school and second grade boys. (Author/SET)

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SEX AND AGE DIFFERENCES IN TARGET CHOICE ON AN AGGRESSIVE TASK

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ABSTRACT

The role of inhibition as related to sex differences in aggression was investigated using nursery and second grade children, and a dart gun test with choices of four targets--drawings of a boy, girl, zebra, and object. There were eight target choices per session, and three sessions. Choice of the human target was assumed to indicate low inhibition; choice of the object target, high inhibition. Age differences were as predicted, the second graders more inhibited than the nursery children. Sex differences were as predicted for the older children; in the younger group, girls were more aggressive than boys. Session effects interacted with age and sex to form different patterns of response for the four groups. Differences between nursery and second grade girls were larger than differences between nursery and second grade boys.

SEX AND AGE DIFFERENCES IN TARGET CHOICE ON AN AGGRESSIVE TASK

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Aggression is a topic of high interest to laymen and scientists alike, and is presently characterized by a surfeit of descriptions, theories, and definitions. The analyses of aggression have used psychoanalytic, ethological, learning, social learning, and modeling theories. The multitude of theories is complicated by the numerous definitions and manifestations of aggression which include physical attacks, verbal cuts, and indirect passive aggression.

The resurgence of interest in biological factors draws attention to the humoral factors in aggression, the role of the limbic system, and the contributions of genetics generally. Simultaneously, the vastly expanding literature on family and cultural conditioning emphasizes the roles of reinforcement, imitation, and expectation. Recent comprehensive summaries (e.g., Feshbach, 1970) show how far we are from definitive statements about the nature of aggression. One can easily empathize with Johnson's straddling (1972):

> Aggression is a complex rather than a unitary process, and it is under multifactored control...Aggression may be influenced by both genetic and learned factors, or it may be instrumental behavior, with the attack being incidental to other goals. Because of such complex dynamics, the term aggression defies simple definitions and sweeping generalizations, and requires analysis on many levels from different points of view. (p. 41)

The point of view from which we are investigating sex and age differences in aggression relies more on learning and social learning hypotheses than on biogenetic ones. Without deprecating the importance of constitutional differences among children and between sexes, and in full recognition that the social experiences interact with a dynamic active organism, we believe that girls may be less aggressive than boys because they learn as they develop to inhibit aggression more than males. To investigate such an inhibition hypothesis, one needs an

experiment designed to reduce inhibitions to aggression. If sex differences disappear under conditions of reduced inhibition, one possible inference is that the inhibition was primarily responsible for the initially observed sex differences.

A projective test of aggression was developed, in which the targets of aggression were drawings of a boy, a girl, a zebra, and an object, and the children had to choose which to "shoot and hurt" with a dart gun. The assumption is that the most aggressive choice is that of the human targets, and that the choice of animal or object reflects increasingly more inhibition or lower aggression. The rationale behind the dart gun test stems from Miller's (1948) study of displacement as a function of response tendency and inhibition. Figure 1 illustrates how this model might apply. Inhibition against shooting an actual child with a dart gun is greater than the actual response tendency; consequently, this response would not occur. Since the inhibition gradient is postulated to drop faster than the response gradient, there comes a point on the abscissa where the tendency to shoot is greater than the inhibition against shooting. The strength of response (which is postulated in our experiment to correspond to the frequency of target choice) is the response tendency at a given point on the abscissa minus the strength of inhibition.

Insert Figure 1 about here

Previous experimental evidence has shown that the use of younger subjects (Goodenough, 1931; Rosenzweig and Rosenzweig, 1952), and the use of a projective test in a permissive setting with repeated sessions (Bach, 1945; Durrett, 1959; Pintler, Phillips, and Sears, 1946; Sears, 1951; Sears, Rau, and Alpert, 1965) is effective in lowering inhibition. This study utilizes both findings in its design.

Oetzel's summary (1966) of studies of sex differences in children's aggression indicates that boys are more aggressive than girls when direct physical aggressive responses are assessed. Therefore, our hypothesis is 1) that boys choose the human target more and the object target less than girls. Since inhibition is learned with age, 2) second grade children choose object target more and human target less than nursery school children. If girls learn more inhibition of aggression as they mature in our society than boys, as we contend, then 3) the differences between nursery and second grade girls on aggressive responses should be greater than the difference between nursery and second grade boys. Some additional hypotheses will be discussed in context.

Method

Overall design

Boys and girls of two ages were seen individually in three separate sessions by a twenty-year old white male. In each session, each child had eight choices of a target to "shoot and hurt," using a dart gun with rubber-tipped darts. Each child was then briefly questioned about his/her attitudes towards the targets. (In an additional test, not reported here, each child was also rated for aggressive responses during ten minutes of play with an inflated three-foot high Bobo doll, which springs back to an upright position after being hit; half the children being rated before the dart task, half after.) Teachers' ratings of the children's antisocial aggression were obtained.

Subjects

Of the 40 children, half were boys, half girls; half in nursery grade (mean age=3.6 years, range 3.1-4.1), half in second grade (mean age=7.5 years, range 7.0-8.0). The group was predominantly from middle and upper-middle class professional/academic families. The older children were enrolled at the University School. The nursery children were enrolled at the University School or at a cooperative nursery nearby.

Dart test

The four targets were black and white drawings, with minimal detail, of a boy, a girl, a zebra, and an object, each on a separate 2 1/2 x 2 foot board. The object was diamond-shaped, with horizontal wavy lines.

The subjects were taken to a separate room by the experimenter, who had previously sat in their classroom for several visits to become familiar. After being seated, the child was told, "Today, we are going to use this dart gun. It is very dangerous and we must be very careful. Let me show you how it works." The experimenter shot a dart (not at one of the targets), saying, "I bet that would hurt! Now you're going to try it. Over here, (pointing to the targets lined up against a wall) we have a little boy, a little girl, a zebra, and an object. Which would you like to shoot and hurt first, the little boy, the little girl, the zebra, or the object?" The chosen target was moved to a target area six to seven feet from the child. "Okay, (child's name) is going to shoot and hurt the (choice)." The order in which the targets were lined up initially and named to the child was random for each child.

Whenever the child hit a target other than the object target, the experimenter said, "Ouch." The subject took two shots at the same target, with the experimenter helping aim when needed. The subject was then asked if he wanted to "shoot and hurt" the (choice) some more, or if he wanted to "shoot and hurt" something else. If the latter, the new target was brought to the target area, and the other was returned to its original position. There were eight choices of targets (16 shots) in each session. Choices were recorded in sequence. The mean intersession period was 1.93 days.

Post-dart test interview

After eight choices, the experimenter said, "Okay, we're done with this for today. Now, I would like to ask you some questions. First, which one of these (name targets in their initial random order) would you say you like the most, like to be near the most, or have with you the most?" After the response, the experimenter asked, "Which one would you say you would like to shoot and hurt the most (name targets)?"

Teachers' ratings

Teachers were asked to rate their students who were subjects on a scale of anti-social agression, the latter being defined as "fighting and arguing with other

children or adults, uncooperativeness with teachers and/or children, disruptive, mischievous, etc." On a six-point scale, a rating of six meant high aggression, and a rating of one meant low aggression. There was one second grade teacher, and two nursery teachers (10 nursery children each).

Results

The mean choices for each of the three sessions for each of the four targets by each group of children appear in Table 1, together with the teachers' mean ratings of antisocial aggression. Figure 2 presents the data pictorially, for the three sessions combined. The analyses of variance for human target choice and object target choice, appear in Table 2. For certain data analyses, to compensate for the fact that there were two human targets and only one animal and one object, the mean frequency of human target choice was calculated by summing the mean frequency of boy choice and girl choice and dividing by two.

Insert Table 1, Figure 2, and Table 2 about here

The modal target choice for three of the four groups of children was the zebra; for the second grade females, the object target was most frequently chosen. The choice of the human targets, summing the boy and girl targets, never exceeded the choice of the zebra and object targets combined, except for the nursery females in their third session.

Sex differences. Males and females did not differ significantly on human target choice. Females did choose the object target more frequently than males did (mean frequencies per session=2.3 vs. 1.6 respectively), but this difference did not reach the desired level of significance ($F=2.85$; df 1,36; $p<.10$).

The zebra, while shot frequently by all groups, was shot more by males than females (3.4 vs. 2.4), the younger girls choosing to shoot humans instead (particularly girl targets!), and the older girls choosing the object.

Age differences. The nursery children chose human targets significantly more frequently than second graders ($F=4.92$; df 1, 36; $p<.05$). Second graders chose the object target significantly more than nursery children ($F=12.3$; df 1,36; $p<.005$. Figures 3 and 4 show these differences. There were no significant age differences in zebra choice.

Insert Figures 3 & 4 about here

Session effects. Table 2 shows no statistically significant change in the frequency of human target or object target choice across the three sessions. In Figures 3 and 4, three of the four groups showed a drop in human target choice from first to second session (the exception being nursery females); three of the four groups showed a rise in object target choice from the first to second session, followed by a drop in the third session (the exception being nursery males). The mean number of zebra choices from session to session remained quite stable, although the separate curves for the four groups showed varying patterns.

Interactions: age, sex, sessions. For human target choice, the interaction of age, sex, and sessions was significant ($F=4.0$, $df=2, 72$, $p<.025$). As can be seen in Figure 3, the difference between nursery and second grade girls increased with each session; the nursery and second grade boys decreased their difference after the first session. The differences between tbe nursery and second grade girls were greater than the differences between the nursery and second grade boys.

For object target choice, the triple interaction just missed significance at the .05 level. The differences between nursery and second grade girls were statistically significant in all three session, with the older girls choosing the object target more than the nursery girls. While the older boys also chose the object target more than the younger boys in each session, their difference reached statistical significance only in the second session. As with the human target choices, the object target choices showed greater differences between the younger and older girls than between the younger and older boys.

Post-dart test questions. In answer to the question, "Which do you like to shoot and hurt the most?," the zebra received 29 votes, the two human targets a combined total of 57 (mean=28.5), and the object 33, over the three sessions. The human target was mentioned significantly more often by nursery females than nursery males ($z=3.06$, $p<.01$), by second grade males than second grade females ($z=3.32$, $p<.001$), and by nursery females than second grade females ($z=5.76$, $p<.001$). The difference between nursery males and second grade males was not significant.

The object target answer showed a similar pattern in reverse. The second grade females picked the object more than any other group, all differences significant at the .001 level. The nursery girls chose the object significantly less than any other group. Nursery males did not differ significantly from second grade males.

The relation between the verbal answer and the target actually shot at earlier was investigated. Each child was assigned a score based on the number of agreements between the verbal and actual response. The percentages of agreements for the nursery boys and girls, and second grade boys and girls were respectively 43%, 30%, 45%, and 35%. These were greater, but not significantly so than the assumed random 25% agreement.

In answer to the question, "Which do you like the most?," the zebra won clearly with 72 responses; the human targets received 28 for the two (mean=14), the object 19. Comparing their verbal liking response to their actual shooting response, the percentages of agreement for the nursery boys and girls, second grade boys and girls were respectively 57%, 35%, 42%, and 37%. Only the first differed significantly at the .05 level from a chance 25%.

Teacher ratings. Our expectations that boys would receive higher aggression ratings than girls, and that this difference would be greater in the older group were confirmed. Males received a mean aggression rating from teachers of 4.3, while females received 2.9; the difference was highly significant (t=3.14, $p < .01$). The difference between ratings for nursery boys and girls was in the predicted direction but did not reach the .05 level; the difference between the sexes in the second grade was highly significant (t=3.41, $p < .01$).

To test the hypotheses that teacher ratings of aggression would be positively correlated with human target choice, and negatively correlated with object target choice, Spearman rank order correlations were run. Some confirmed the hypotheses; e.g., for females, aggression ratings correlated positively with human target choice (rho=.38, $p < .05$, one-tailed), and correlated negatively with object choice on two of the three sessions. The correlations for males, however, were often insignificant or contrary to expectation.

Discussion

There are many types of aggression. The type involved in the dart test may be labelled as fantasy aggression. The children used rubber-tipped darts, and shot at drawings, not actual people or animals. Children were asked which target they would like to "shoot and hurt," and the experimenter's comment about danger and exclamation "ouch" when the dart hit the target were intended to emphasize the hurting aspect. The choosing of a human target may therefore be considered a physical, anti-social, aggressive fantasy, in which high frequency of human target choice may indicate low inhibition to aggression or low aggression anxiety.

Almost all early observational studies reported that nursery boys showed

significantly more physical anti-social aggression than nursery girls (Dawe, 1934; Green, 1933; Jersild & Markey, 1935). It is especially noteworthy, then, that in our dart test the nursery girls equalled the boys in human target aggression in the first session and exceeded them the next two sessions. It is equally noteworthy that with the second grade children, there were no significant sex differences in human target choice in the first two sessions, although by the third session boys showed the predicted relatively greater human target choice. These data suggest the conclusion that in a projective test of fantasy anti-social physical aggression, younger girls may be at least as aggressive as boys, and that older girls, although more inhibited than male peers, may sometimes also show equivalent aggression.

Except for nursery girls, the children "displaced" the majority of their aggressive choices to the zebra and object (the second grade girls being the only one of the four groups to aggress more against the object than the zebra). Moore (1964) attempted a systematic analysis of displaced aggression as a function of varying levels of frustration, using a cork-gun shooting game and pairs of child figures varying in the number of vertical stripes in their garments. Her predictions concerning displacement gradients under differing frustration conditions were not supported for either sex. In the low frustration condition, however, there was a significant sex difference, with boys choosing the targets most-like the frustrating figure, and girls choosing the targets least-like. The significant tendency for those boys rated as low aggressive by their teachers to select most-like figures under low frustration and least-like figures under high frustration was interpreted by Moore as consistent with an aggression anxiety hypothesis. The fact that our second grade girls, with the lowest teacher mean rating of aggression, had the highest object target choice (i.e., the most displacement from the human target) seems consistent with high inhibition/high aggression anxiety notions. However, it is difficult to apply the Miller model (Figure 1) to these target choice experiments. Feshbach (1970, p. 234) expresses the difficulty well: "the need for <u>prior</u> assessment of the slopes and elevation of the approach and avoidance gradients in order to <u>predict</u> the displacement response" [italics added].

The repetition of sessions in a permissive setting did not have the expected consistent effect of reducing inhibitions, except for the nursery girls (who increased their choices of human targets) and, more equivocally, the second grade

boys. The second grade girls, to the contrary, avoided human targets more and more with each session. Session effects interacted with age and sex effects in the manner indicated earlier.

During the post-dart test questioning, the two questions (like most? like to shoot and hurt the most?) may have been confused, particularly by the younger children. However, Ogilvie's (1965) interpretation that the bonds between the target and the aggressor are strengthened following aggression may have application to our situation, as evidenced by one youngster's comment, "I like to shoot 'em even if I like 'em."

To recapitulate the status of our hypotheses: Sex differences were far from clearcut, the younger girls appearing to be at least as aggressive in their choices as the boys. The hypothesis that males choose human targets more than females do was not confirmed, due largely to the nursery girls' relish at shooting human targets. The hypothesis that females choose the object target (least aggressive choice) more than males was confirmed only for the older children. The zebra, a popular choice, was more heavily aggressed against by males than females, at both ages. Age differences were far clearer--the second grade children choosing the object target more and the human target significantly less than the nursery children, as hypothesized. The third hypothesis of larger differences between nursery and second grade girls than between nursery and second grade boys was confirmed both by the dart test results and the teacher ratings of aggression. The interview data also showed a similar pattern of large differences between the girls of two ages in their answers to the question "Which do you like to shoot and hurt the most?" as contrasted to smaller or no differences between the boys of two ages.

These data tend to support the inhibition concept that young boys and girls may not differ in their response tendency to aggression, but that as they age in our society, girls learn to inhibit their aggression more than boys, to displace it, to learn more indirect and socially acceptable ways to express it. We do not underestimate the strength of the biogenetic arguments, and are aware that even Maccoby and Jacklin (1971), who argue against sex differences in general activity level and in dependency behaviors, conclude that boys are the more aggressive sex, and they infer a biochemical contribution to the greater male aggressiveness. Socialization patterns and biochemical differences appear to be operating in the same direction, and their interactions are not teased apart by

our design. Nonetheless, at this point, our data seem to point to social learning more than genetic and biological factors as responsible for sex differences in aggression in these age groups.

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Table 1

Mean Frequencies of Target Choices, per Session, per Group, and Teachers' Mean Ratings of Aggression

Targets	Nursery Males	Nursery Females	Second Males	Second Females
Session 1:				
Boy	1.8	1.8	1.9	1.9
Girl	2.0	2.1	.8	1.1
Zebra	2.9	2.9	3.6	2.4
Object	1.3	1.2	1.7	2.6
Session 2:				
Boy	1.4	1.1	1.3	1.2
Girl	1.4	2.9	1.2	1.3
Zebra	4.1	2.5	2.8	1.8
Object	1.1	1.5	2.7	3.7
Session 3:				
Boy	1.5	2.4	1.6	1.1
Girl	1.3	2.2	1.6	1.0
Zebra	3.8	2.1	3.1	2.4
Object	1.4	1.3	1.7	3.5
Combined Sessions Mean:				
Boy	1.6	1.8	1.6	1.4
Girl	1.6	2.4	1.2	1.1
Zebra	3.6	2.5	3.2	2.2
Object	1.3	1.3	2.0	3.3
Teacher Rating	4.3	3.2	4.3	2.6

Table 2

Analyses of Variance for Human and Object Target Choices as a Function of Age, Sex, and Sessions

Source	df	Human			Object		
		MS	F	p	MS	F	p
Total	119						
Between Ss	39						
Age (A)	1	29.0	4.92	$<.05$	54.7	12.3	$<.005$
Sex (B)	1	4.3	<1		12.7	2.9	$=.10$
AxB	1	12.8	2.17	$<.2$	10.1	2.3	$<.2$
Error_{BS}	36	5.9			4.5		
Within Ss	80						
Sessions (C)	2	1.6	1.08		3.0	2.4	$=.1$
AxC	2	.1			2.6	2.0	$<.20$
BxC	2	.5	<1		0.6	<1	
AxBxC	2	5.9	3.99	$<.025$	3.8	3.0	$<.1$
Error_{WS}	72	1.9			1.3		

Note.--F for 1 and 36 df=4.13, for $p<.05$, and 7.41 for $p<.01$. F for 2 and 72 df=3.14 for $p<.05$, and 4.95 for $p<.01$.

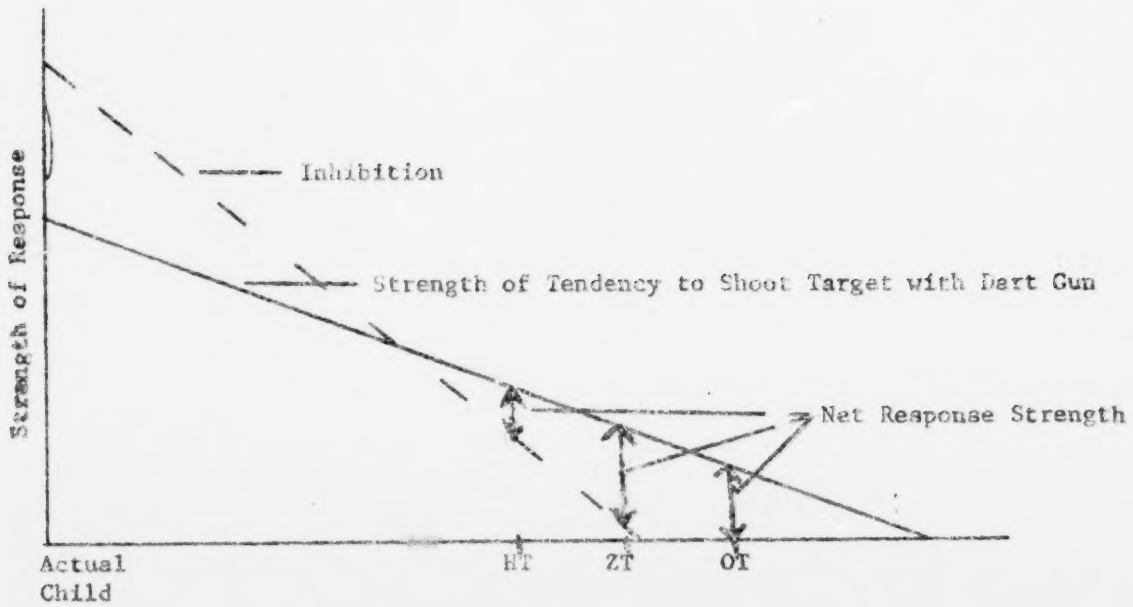

Fig. 1. Miller's (1948) model of displacement as a function of inhibition and response tendency, applied to dart test. (HT=human target; ZT=zebra target; OT=Object target).

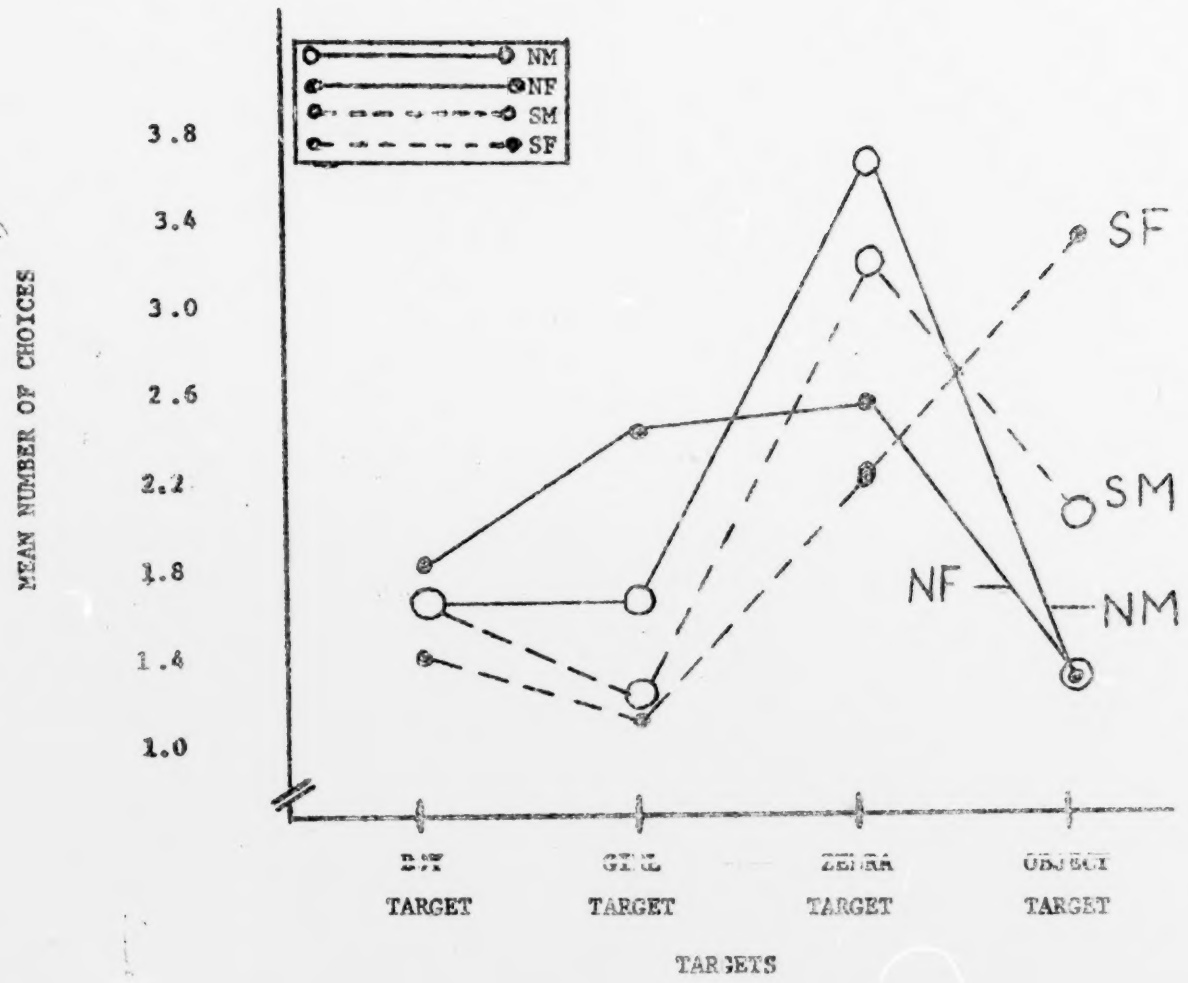

Fig. 2. Mean frequency of target choice by NM (nursery males), NF (nursery females), SM (second grade males), and SF (second grade females).

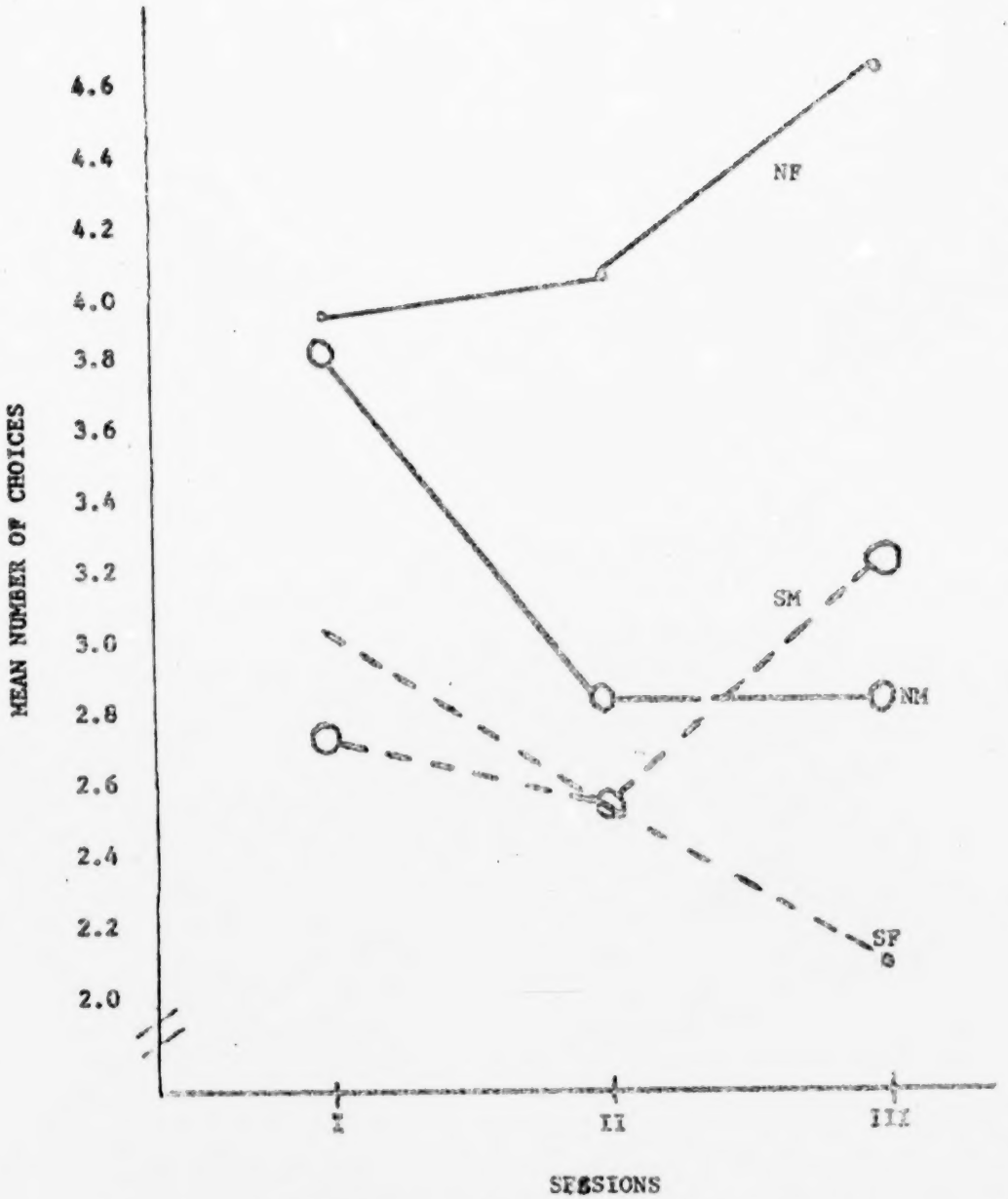

Fig. 3. Mean frequency of human target choice as a function of age, sex and sessions (NM=nursery males; NF=nursery females; SM=second grade males; SF=second grade females).

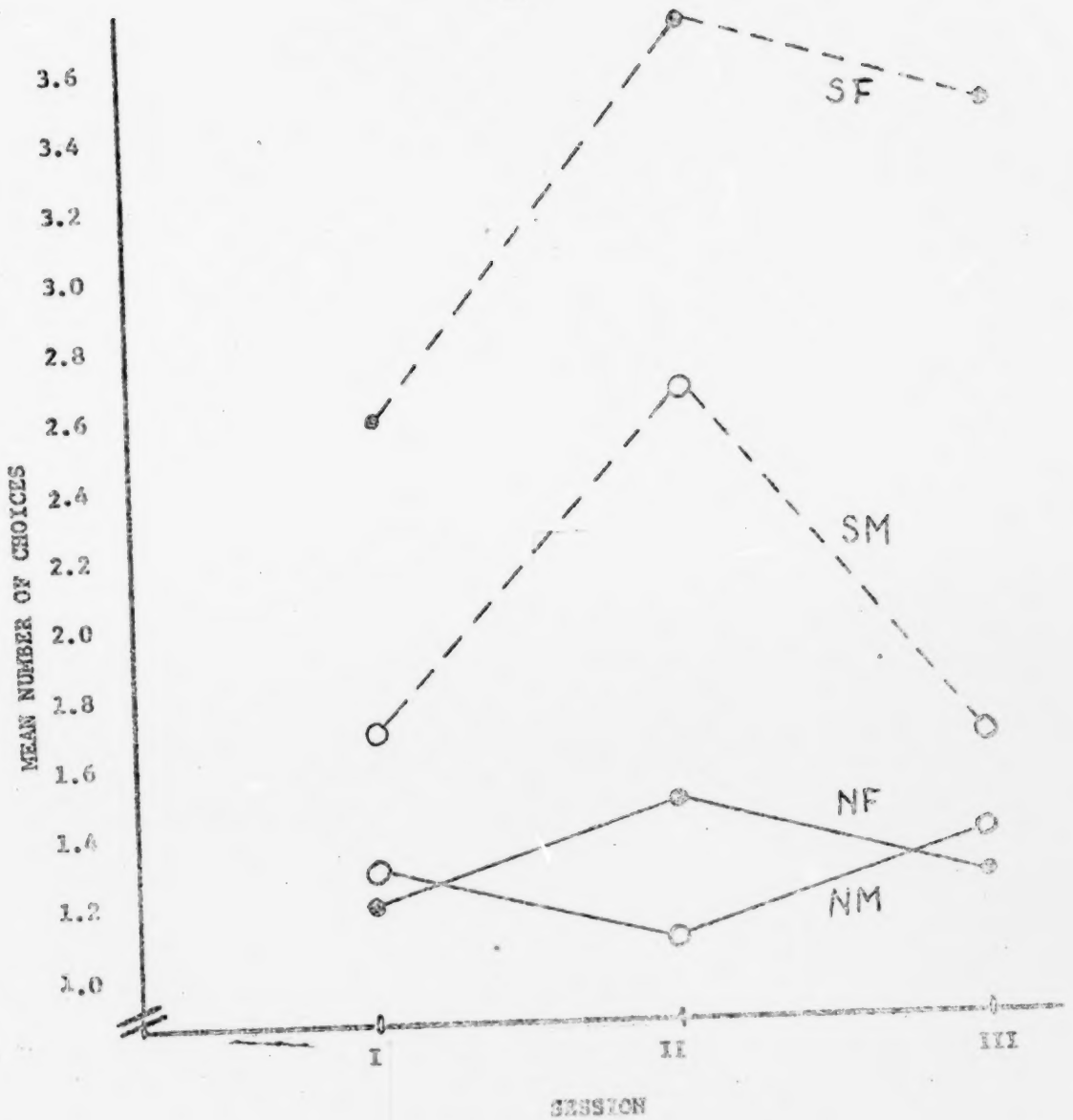

Fig. 4. Mean frequency of object target choice as a function of age, sex, and sessions (NM=nursery males; NF=nursery females; SM=second grade males; SF=second grade females).